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Does choosing jobs based on income risk lead to higher job satisfaction in the long run? Evidence from the natural experiment of German reunification

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ABSTRACT

Workers make job choices based in part on their income risk preferences. But how important is risk matching for long-run job satisfaction? Empirical research has been limited because job choices are endogenous, hindering identification of causal effects. We circumvent these problems by using data from the natural experiment of German Reunification. Pre-reunification East Germans chose jobs in a socialist environment without market income risk. These jobs were then exposed to market risks post-reunification, providing quasi-experimental variation. We find that workers in pre-reunification jobs report relatively higher job satisfaction, despite being less well-matched in terms of risk preferences. This unexpected result is robust to alternate explanations which might affect job satisfaction such as potential differences in job expectations, self-selection into leaving pre-reunification jobs, and past unemployment spells. We conjecture the results are consistent with projection bias: individuals at the start of their careers may over-estimate the extent to which risk matching matters for their future job satisfaction.

"Choose a job you love, and you will never have to work a day in your life"

– attributed to Confucius

1. Introduction

Workers trade off a bewildering variety of attributes when making job choices. Besides the usual considerations of skills, aptitude and taste, job seekers must also assess whether the job income risks match their present and future risk preferences. While a considerable literature exists on risk preferences and behavior, and on the determinants of job satisfaction, there is little causal evidence on the role that risk preference matching plays in job satisfaction. We examine how risk preference matching affects the subsequent long-run job satisfaction of employees, using the natural experiment of German reunification.

Risk preferences significantly affect job choices (Bonin et al., 2007). More risk-averse workers tend to prefer jobs with greater security and more predictable earnings, while less risk-averse workers may accept volatility in earnings in exchange for other benefits or higher expected incomes (Bellante and Link, 1981). Accordingly, civil service or unionized positions often attract relatively risk-averse workers. Conversely, workers who tolerate higher risks may be more likely to become entrepreneurs, or to work in private sector, non-unionized jobs, accepting greater variance in income and a higher risk of business failure or unemployment (Bellemare and Shearer, 2010). Risk matching is an important enough dimension of job choice that risk-averse workers may sort into low-risk jobs even if not otherwise well suited, harming on-the-job performance (Böhm and Riedel, 2013).

This paper answers a first-order question: Do workers actually maximize long-run utility – measured as job satisfaction – when they make job choices with risk preferences in mind? Although job satisfaction is just one measure of job quality, optimizing individuals should be weakly more satisfied with their jobs if they consider their own risk preferences when choosing jobs. Whether and to what extent this prediction is empirically confirmed provides insight on the relative importance that income risk matching plays in job satisfaction. This relationship has relevance for understanding the welfare effects of broader labor market phenomena, such

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as the ongoing shift in many countries away from relatively secure permanent employment positions, towards more volatile contract and freelance work.

We start by describing an idealized thought experiment that provides causal estimates of the effect of appropriate risk matching on job satisfaction. This thought experiment is vital because simple estimates based on observational data are biased since existing job choices and compensation schemes are endogenous with respect to risk preferences (Buurman et al., 2012; Dohmen and Falk, 2010; Grund and Sliwka, 2010; Pfeifer, 2011). Our thought experiment begins with a population of workers holding freely-chosen jobs in a standard market economy. Suppose a treatment group is chosen at random from this population. The effect of risk matching on job satisfaction can be determined by randomly assigning income risks to the jobs held by the treatment group, allowing a comparison of their subsequent job satisfaction to that of the control group whose income risks remain unchanged. Note that our thought experiment requires randomization of income risks rather than of jobs, since we are investigating the marginal impact of considering income risks *in addition* to other factors when choosing jobs, relative to choosing jobs freely in all respects except income risks. As actually assigning income risks randomly to workers in the field is impractical for most real-world jobs, we use the natural experiment of German reunification to approximate the experiment using observational data.

Our ideal thought experiment is approximated through comparing, between subjects, the self-reported job satisfaction of East and West Germans who are still holding pre-reunification jobs[1] after the German reunification. East Germans, whose pre-reunification job choices were orthogonal to income risk, form our treatment group. West Germans form our control group. This comparison is suitable for four reasons. First, while the division of Germany into East and West as a result of differences in political ideology lasted for forty-one years, the two states shared extended common cultural and social histories. Despite the separation, East and West Germany continued to share an identical language and some institutional features such as the structure of the education system. Second, prior to reunification, the socialist state in East Germany (the former German Democratic Republic or GDR) restricted income risk variation in the East German labor market through compressing wages and guaranteeing employment (Krueger and Pischke, 1995). On the other hand, West Germany (the former Federal Republic of Germany or FRG) had a market economy long before reunification. Third, the rapid introduction of a modern market economy post-reunification exposed workers in the former GDR to market-based income risk for the first time while leaving West Germans unaffected relative to the pre-reunification era. Finally, West German wage levels, labor market standards and protections, and social welfare entitlements were adopted in East Germany following reunification, resulting in broadly comparable employment conditions for workers across Germany (Snower and Merkl, 2006).[2]

Our paper's identification strategy draws on a literature establishing the German reunification as an ideal natural experiment for studies on risk matching and job choice. In a seminal paper, Fuchs-Schündeln and Schündeln (2005) used evidence from the German reunification to show that self-selection into jobs based on risk significantly biases estimates of precautionary savings behavior. While standard life-cycle models predict that precautionary savings *increase* with labor income risks, precautionary savings also *decrease* with greater risk tolerance. These forces offset when workers self-select into jobs based on income risks, leading workers in low-risk jobs to save more than expected, and workers in high-risk jobs to save less than expected. Fuchs-Schündeln and Schündeln (2005) find that these offsetting dynamics are muted amongst East Germans holding pre-reunification jobs, whose precautionary savings vary significantly more with labour income risks than their West German counterparts. Their finding is consistent with East Germans sorting into pre-reunification jobs on the basis of factors other than risk preferences.

While there are concerns on the suitability of comparing (former) East and West Germans, our research design circumvents many of the difficulties of cross-country analyses typical in the literature. As we outline in the Methods section, we employ a pseudo difference-in-differences strategy that allows us to control for the fact that East Germans are exposed to a different working environment from West Germans. Our identifying assumption is that, conditional on our controls, East and West Germans holding pre-reunification jobs are similar enough with respect to employment decisions, conditions, and expectations, to be comparable. We show in robustness tests that our results are substantively unaffected by controlling for potential sources of bias such as differences between East and West Germans in labour mobility, job expectations, and unemployment spells.[3] We also test for whether older workers, who have less labour mobility as a group (Mincer and Jovanovic, 1981), are more significantly affected by the lack of income risk matching in their pre-reunification jobs. Accordingly, our empirical strategy relies on East and West Germans effectively forming the treatment and control groups, respectively, to identify the causal impact of risk-based job choice on job satisfaction.

The remainder of Section 1 discusses the prior literature on job satisfaction. Section 2 explains important institutional details of the pre-reunification East German labour market. Section 3 outlines the empirical strategy and our data sample drawn from the German Socio-Economic Panel. Section 4 presents the main results, while Section 5 presents a series of robustness tests. Section 6 concludes.

1.1. Prior literature

Subjective well-being is the subject of a rich literature (Dolan et al., 2008), and even the specialized topic of job satisfaction (rather than generalized life satisfaction) is difficult to cover in a short review. Here, we focus on the most directly related portions of the job satisfaction literature. We are not aware of a study that attempts to provide causal evidence on the relationship between risk-matching and job satisfaction.[4] Studies do show that self-selection into jobs based on income risks is correlated with higher job satisfaction. Cornelissen et al. (2011) demonstrate that risk seeking workers who sort into performance-pay jobs have higher job satisfaction as a result of capturing the rents provided by such jobs as a compensating differential to attract relatively

[1] Pre-reunification jobs refer to job choices made before the German reunification. Pre-reunification job choice in East Germany is assumed to take place without income risk matching, but pre-reunification job choice in West Germany is assumed to take place with income risk matching. Additional details follow in the next section.

[2] Rapid convergence in labor market conditions also caused significant unemployment in East Germany, since labor costs rose dramatically as a result (Snower and Merkl, 2006). We address concerns that these disruptions to the East German labor market may bias our estimates through a difference-in-differences strategy, described shortly, and through additional robustness checks reported after the main results.

[3] Labour mobility in particular is relatively low in Germany compared to Anglo-Saxon countries due to stricter employment regulations (Dustmann and Pereira, 2008), which suggests job switching costs are an exogenous barrier to leaving pre-reunification jobs.

[4] A significant literature in job satisfaction similarly involving self-selection issues examines the stylized fact that union members are generally less satisfied than non-members. One central question is whether self-selection affects the job satisfaction of union members and to what extent. Heywood et al. (2002) and Powdthavee (2011) provide recent causal evidence and reviews of the literature on this topic.

risk-averse workers. Luechinger et al. (2010) show that workers who self-select into the public sector on the basis of risk preferences have higher job satisfaction than they would have had in the private sector. While these studies suggest that job satisfaction is positively affected by the extent of risk-preference matching, they are limited by studying settings where workers are already self-selected into jobs based on risk.

Another part of the job satisfaction literature examines the relative importance of income-related factors, compared to non-pecuniary characteristics, for job satisfaction. Skalli, Theodossiou and Vasileiou (2008) examine how respondents rate satisfaction with different aspects of their job, using the European Community Household Panel. They show that the 'type of work' performed is a consistently stronger determinant of overall job satisfaction than income, in all the 10 European countries surveyed, and both in the short and long run. Similarly, Sousa-Poza and Sousa-Poza (2000) show using the International Social Survey Program that respondents consider whether they have an 'interesting job', and 'good relations with management' to be more important determinants of overall job satisfaction than income. Moreover, they find the marginal impact of income on job satisfaction is comparable to other factors such as the degree of independence at work, and relations with colleagues.

The literature thus far indicates that income risk matching clearly matters for job satisfaction, yet stops short of providing causal evidence. The available evidence also indicates job satisfaction depends relatively strongly on non-pecuniary factors relating to the intrinsic characteristics of the job. We expect likewise that the impact of income risk-matching on job satisfaction will depend on the extent to which workers trade-off income risks for other job characteristics.

2. The East German labor market before reunification

In the state-socialist society of the former GDR, political and economic decisions were centralized at the state level. The state owned all firms and provided guidelines on wage levels. State intervention compressed the nominal wage structure in the GDR before reunification in 1990, with flat profiles on age-earnings and experience-earnings persisting in the early years after reunification (Krueger and Pischke, 1995; Orlowski and Riphahn, 2009). The average net income of individuals with a university degree was only 15% higher than that of blue collar workers, compared to 70% higher in the FRG. Intersectoral differences in net incomes amounted to an average of only 150 Marks per month, a small amount compared to the aggregate average monthly income of around 1100 Marks in 1988 (Fuchs-Schündeln and Schündeln, 2005). Further, due to the ideology of equality of opportunity in the state-socialist society, employment was constitutionally guaranteed.

Despite extensive state intervention in the labor market, most East Germans could freely choose jobs (Krueger and Pischke, 1995). The GDR policy of a "state-governed labor force allocation" did not prevent individually initiated job changes, and lateral job shifts were prevalent (Huinink and Solga, 1994). However, the ability to choose jobs depended on social strata. East Germans can be broadly distinguished between the "privileged", "average workers" and the "disfavored" (Adler, 2002). These three groups were defined by the amount of preferential treatment they had in terms of job choice, housing and economic privileges. The privileged group comprised of East Germans who expressed overt system loyalty, such as state bureaucrats and those with credentials such as membership in the official GDR youth organization, political opinions in accordance with official government positions, and the appropriate family background. In return for their loyalty, the privileged group received preferential treatment in terms of housing and economic privileges (Fuchs-Schündeln and Schündeln, 2005). Upward mobility through job choice was also more likely for this group of East Germans (Huinink and Solga, 1994). Jobs for the "disfavored" group, in contrast, were mostly assigned by the State. They were also denied access to job training and housing as they were deemed to be political opponents who were not aligned with the State's ideology. However, most East Germans fell into the category of "average workers" . While these East Germans did not have preferential treatment like the "privileged", they were generally free to choose their jobs unlike the "disfavored" (Krueger and Pischke, 1995). Further, measures were in place to ensure upward mobility for this group since the socialist regime relied on the support of the working class. These measures, known as the "worker-and-farmer-children bonus" ensured that managerial and professional positions were accessible by not only the "privileged" but also the working class (Huinink and Solga, 1994; Solga and Konietzka, 1999).

In sum, it appears that apart from the "disfavored" group, East Germans were generally free to choose their jobs in the GDR. However, as wages were compressed and employment was constitutionally guaranteed, income risk preferences should not have been a major determining factor in East German job choice.

3. Methods

Our identification strategy is based on the assumption that East and West Germans who chose jobs pre-reunification and who still retain those jobs post-reunification are broadly comparable, but differ in one important respect: East Germans chose jobs without regard to income risks, while West Germans chose jobs in accordance with risk matching. Supporting our observation, Fuchs-Schündeln and Schündeln (2005) and Böhm and Riedel (2013) document that even years after reunification, East and West Germans who hold pre-reunification jobs continue to exhibit significant differences in the degree to which their jobs match their innate income risk preferences. While the simplest empirical method is to estimate a difference-in-differences model of the job satisfaction of East and West Germans before and after reunification, we lack pre-reunification data on East Germans. Unfortunately, the German Socio-Economic Panel only began sampling East Germans post-reunification, and we are not aware of any other panel datasets that contain comprehensive data on the job satisfaction of East Germans prior to reunification. As we are limited to post-reunification data, we employ a pseudo difference-in-differences strategy.

An estimate of the effect of risk-based job choice based on post-reunification data of East and West Germans holding pre-reunification jobs will be confounded by the effects of differences in living and working conditions between East and West Germany. We need to difference out the generalized impact of having lived and worked in East versus West Germany. We do so by augmenting the model with East and West Germans who chose their jobs post-reunification, which provides an estimate of the effect of differences in living and working conditions between East and West Germany. This allows us to separate the partial effect of risk-based job choice, from the effect of long-run exposure to the East German system and from the effect of having made job choices in different eras.

Formally, we estimate the following post-reunification job satisfaction regression:

$$Jobsat_{it} = \alpha + \mu_1 Old_i + \mu_2 EG_i + \mu_3 EG_i \cdot Old_i + \beta X_{it} + \delta EG_i \cdot X_{it} + u_i + \varepsilon_{it}$$

where $Jobsat_{it}$ refers to the job satisfaction of individual i in year t, measured in the German Socio-Economic Panel on a scale of 0 (completely dissatisfied) to 10 (completely satisfied). The variable

Old_i is a time invariant dummy variable which takes the value 1 if the individual holds a pre-reunification job and 0 if the individual holds a post-reunification job.[5] EG_i is a dummy variable which takes the value 1 if the individual lived in East Germany before reunification and 0 if he or she lived in West Germany before reunification. $EG_i \cdot Old_i$ is an interaction dummy of EG_i and Old_i which takes the value 1 if the individual is an East German with a pre-reunification job and 0 otherwise. Therefore, $EG_i \cdot Old_i$ identifies East Germans who hold jobs chosen without income risk considerations.

The effect of risk-based job choice on job satisfaction is derived by estimating the difference in job satisfaction between East and West Germans holding pre-reunification jobs, and then subtracting the difference in job satisfaction between East and West Germans holding post-reunification jobs. To obtain the difference in pre-reunification job satisfaction between East and West Germans, we start with the effect of an East German holding a pre-reunification job: $\mu_1 + \mu_2 + \mu_3$. The effect of a West German holding a pre-reunification job is μ_1, as $EG_i \cdot Old_i$ and EG_i are equal to zero. Thus, the difference in job satisfaction between East and West Germans holding pre-reunification jobs is $(\mu_1 + \mu_2 + \mu_3) - (\mu_1) = \mu_2 + \mu_3$. The corresponding difference in job satisfaction between East and West Germans holding post-reunification jobs is the East German effect of μ_2, as the baseline is a West German holding a post-reunification job, when Old_i, $EG_i \cdot Old_i$ and EG_i are all equal to zero. The generalized difference in job satisfaction between East and West Germany can be eliminated from the difference in job satisfaction attributable to holding a pre-reunification job by subtracting μ_2 from $\mu_2 + \mu_3$. Therefore, μ_3 estimates the relative effect of making job choices in the absence of risk preference matching.

The rest of our model in terms of the controls X_{it} follows the literature on the determinants of job satisfaction.[6] We control for the individual's job characteristics such as whether the individual held a job from the public or the private sector, whether the individual was a career civil servant (*Beamte*), job income, the level of autonomy at work (1: low autonomy; 5: high autonomy), duration with the current firm, working hours and firm size.[7] We also control for socioeconomic characteristics such as current residence in East or West Germany, gender, age, education, health, disability and marital status.[8] We include both age and the square of age, to capture the U-shaped relationship between job satisfaction and age (Clark et al., 1996). We included a vector of interactions $\delta EG \cdot X_{it}$ between the East German dummy and our controls to allow the estimates to differ by pre-reunification region of residence, to prevent μ_3 from being confounded by any correlation between our controls and East or West German origin.

Studies have shown that allowing for fixed effects changes estimates in life satisfaction regressions substantially (Ferrer-i-Carbonell and Frijters, 2004). Thus, we have good reasons to suspect potential correlation between our independent variables and the time invariant unobserved individual characteristics u_i. While fixed effects estimation provides unbiased estimates in the presence of correlation between independent variables and unobserved individual effects, it also prevents us from estimating the effect of our main variables of interest, EG_i and $EG_i \cdot Old_i$, which are time invariant. Random effects estimation, on the other hand, allows us to preserve the time invariant dummy variables but is efficient only if unobserved individual characteristics u_i, are orthogonal to the exogenous regressors in the equation.

To preserve the time invariant variables of interest and at the same time correct for the correlation between time invariant unobserved heterogeneity and the regressors in the model, we adopt the Hausman-Taylor model (Hausman and Taylor, 1981). The Hausman and Taylor estimator is based upon an instrumental variable estimator which uses the individual means of the strictly exogenous variables as instruments for independent variables that are correlated with the unobserved individual effects. Since we are unaware of any study which discusses the relationships between our independent variables and the unobserved individual effects, we are forced to form assumptions about the endogenous nature of the independent variables. We test our assumptions by specifying each variable as endogenous in our Hausman-Taylor estimation, leaving the rest as instruments, and testing each specification using the Hausman Test. With this method, we identified three endogenous variables – poor health, duration with firm, and work hours per week. Whether the individual holds a pre-reunification job or post-reunification job is not found to be correlated with unobserved individual effects using this method, and hence will be treated as exogenous in our empirical estimation.

3.1. Data

Our data comes from the German Socio-Economic Panel (GSOEP).[9] This annual panel survey started in 1984 and initially sampled only West German households. East German households were included in the panel from 1990 onwards. East and West Germans are identified according to their location of residence in 1989, as provided in the questionnaire. Individuals who resided in the GDR before reunification in 1990 are referred to as East Germans and individuals who resided in the FRG before 1990 are referred to as West Germans.

Our sample consists of the surveys conducted from 1995 to 2001. We chose this sampling period for several reasons. First, the East German economy underwent substantial reforms in the early years after reunification as it transformed from a socialist economy to a market based economy. To forestall competition from the East, West German labor unions negotiated for East German wages to adjust to levels comparable to West German standards. The rapid convergence of East German wages to West German levels and the market reforms introduced market income risk and variation in income levels to the East German labor market. This convergence process stagnated after 1995, which makes 1995 ideal to begin our study (Gernandt and Pfeiffer, 2009). Second, allowing 5 years to lapse after reunification allowed us to obtain a large enough sample of East and West Germans who switched jobs after reunification. This sample is needed to difference out the effects of other factors that vary between East and West Germany.[10] Third, beginning our study in 1995 allows us to include important variables,

[5] We do not distinguish between whether the present job results from first-time employment or if it results from a job switch. Thus, individuals holding post-reunification jobs could have switched into them from pre-reunification jobs. We discuss possible sources of bias resulting from job switching in the robustness section.

[6] Of particular relevance to our paper is work that also uses the GSOEP to estimate the determinants of job satisfaction, such as Clark et al., 1998; Luechinger et al., 2010; Cornelissen et al., 2011.

[7] The *Beamte* are professional civil servants set apart by German law from regular public employees. One key difference is that *Beamte* hold job tenure for life after completing training and probation.

[8] In our model, current residence in East or West Germany is distinct from East or West German origin, which is defined by place of residence at the time of re-reunification. The distinction is necessary because of post-reunification migration, and the variable for current residence location helps control for any present-day differences between East and West Germany that may affect job satisfaction.

[9] The data used in this paper was extracted using the Add-On package PanelWhiz for Stata®. PanelWhiz (http://www.PanelWhiz.eu) was written by Dr. John P. Haisken-DeNew (john@PanelWhiz.eu). See Haisken-DeNew and Hahn (2010) as well as Hahn and Haisken-DeNew (2013) for details. The PanelWhiz generated DO file to retrieve the data used here is available upon request. Any data or computational errors in this paper are our own.

[10] Since variation in East German wages took place over time, the East Germans who switched jobs soon after reunification did not face the same income risk variation as West Germans when making their job choices. Nevertheless, they faced

such as the state of health, which were otherwise not available continuously before 1995. A further benefit of this sampling period is that we are able to use the refreshment samples in 1998 and 2000, in particular the East German samples. We exclude data after 2001, following Fuchs-Schündeln and Schündeln (2005) whose results are based on the 1998 to 2000 waves. As a practical matter, as time passes, the sample of workers holding pre-reunification jobs shrinks rapidly due to retirement and job switches, making it less likely that our identifying assumptions hold, and leaving the estimates to be driven largely by the earlier period in any case. Recent work on risk preferences has exploited the 2004 wave of the GSOEP, which included a special module that elicited individual risk preferences (Bonin et al., 2007; Grund and Sliwka, 2010; Luechinger et al., 2010; Cornelissen et al., 2011). However, because no information on individual risk aversion is available in prior years, and the bulk of our data predates the 2004 wave by a number of years, we choose not to use this measure of individual risk aversion. While we have excluded the post 2001 GSOEP data, we note that our results remain broadly unchanged if we use an extended sample, whose results are available in the appendix.[11]

We excluded foreigners and immigrants in the GSOEP from our sample and restricted our analysis to only individuals who were not self-employed and reported themselves to be full-time employed. We exclude part-time employees as we are less certain that their job choices were made with reference to labor income risks, since workers self-selecting into part-time positions may have other sources of income. We identified individuals who joined their jobs under the socialist regime by separating the employed individuals into two cohorts based on the reported year they joined their jobs with their existing employers.[12] The individuals who joined their jobs before reunification are identified from those who reported joining their jobs in the year 1989 or earlier, while those who joined their jobs after reunification are identified from those who reported joining their jobs between 1990 and 1994.[13] Our selection criteria left us with 662 East Germans and 2465 West Germans with pre-reunification jobs and 1164 East Germans and 1094 West Germans with post-reunification jobs. 46% of the East Germans with pre-reunification jobs and 32% of the West Germans with pre-reunification jobs were in the public sector while 26% of the East Germans and 27% of the West Germans with post-reunification jobs were in the public sector. The summary statistics of the data used in our analyses are provided in Table 1.[14]

Table 1
Summary statistics of the GSOEP analysis sample from 1995–2001.

Variables	East Germans N = 1826	West Germans N = 3559
Job Satisfaction	6.833	7.117
(0: Low, 10: High)	(1.961)	(1.940)
Cohort before 1990	0.401	0.711
(1: Yes, 0: No)	(0.490)	(0.453)
Living in East Germany	0.940	0.004
(1: Yes, 0: No)	(0.242)	(0.060)
Public Sector Employee	0.36	0.306
(1: Yes, 0: No)	(0.479)	(0.461)
Career Civil Servant (*Beamte*)	0.04	0.115
(1: Yes, 0: No)	(0.202)	(0.319)
Autonomy	2.555	2.781
(0: Apprentice, 5: High Autonomy)	(0.909)	(0.994)
Duration with Firm	11.282	15.472
(in years)	(9.232)	(9.669)
Work Hours per Week	44.19	42.118
(in hours)	(7.287)	(6.537)
Log Personal Income	7.037	7.364
	(0.334)	(0.370)
Firm Size: 20 to 199	0.366	0.263
(1: Yes, 0: No)	(0.482)	(0.440)
Firm Size: 200 to 1999	0.221	0.267
(1: Yes, 0: No)	(0.415)	(0.443)
Firm Size: 2000+	0.193	0.328
(1: Yes, 0: No)	(0.395)	(0.470)
Current Health	2.482	2.441
(1: Very Good, 5: Bad)	(0.778)	(0.846)
Disability	0.042	0.082
(1: Yes, 0: No)	(0.200)	(0.274)
Vocational Degree	0.966	0.872
(1: Yes, 0: No)	(0.180)	(0.334)
College Degree	0.196	0.066
(1: Yes, 0: No)	(0.397)	(0.248)
Married	0.73	0.665
(1: Yes, 0: No)	(0.444)	(0.472)
Disrupted Marriage	0.09	0.11
(1: Yes, 0: No)	(0.290)	(0.313)
Male	0.598	0.724
(1: Yes, 0: No)	(0.490)	(0.447)
Age	41.28	41.796
	(9.983)	(10.335)

Notes: Standard deviation is reported in parentheses. Data are pooled for the years 1995 to 2001. There are 1826 East Germans in the sample, with 662 holding pre-reunification jobs and 1164 holding post-reunification jobs. There are 3559 West Germans in the sample, with 2465 holding pre-reunification jobs and 1094 holding post-reunification jobs. Disrupted Marriage refers to those who are Separated, Divorced or Widowed.

4. Results

Table 2 presents results for random effects (1), fixed effects (2) as well as Hausman-Taylor estimates with and without occupational dummies (3 - 4). The Hausman test rejects the random effects model in favor of the fixed effects model, suggesting that some of the independent variables are correlated with the unobserved individual effects. In the Hausman-Taylor specifications presented in columns (3) and (4), the Hausman test fails to reject Hausman-Taylor estimates in favor of the fixed effects estimates when duration with firm, working hours and poor health are specified to be endogenous.[15] Since the Hausman-Taylor estimates are

substantially higher income risk variation than those who made their job choices before reunification.

[11] We did not find significant differences in μ_3 using the extended dataset from 1995 to 2006 as compared to our shorter panel from 1995 to 2001. However, the Hausman test result suggests that some correlation between the independent variables and the unobserved individual effects may remain despite using Hausman Taylor estimation. Nonetheless, the sign and magnitude of μ_3 remains very similar. Estimation results using the extended dataset from 1995 to 2006 are in the appendix.

[12] The reported year of joining one's job is cross-checked against the response to another survey question which asks if the individual had changed jobs in the previous year. When a disparity occurs, we adopted the same treatment employed to generate the variable $ERWZEIT as described in http://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.60055.de/pgen.pdf.

[13] A small number of pre-reunification job holders report occasional unemployment spells during the period 1990-1994. However, as these workers are holding pre-reunification jobs as of 1995, they should have been in regular employment during 1990-1994. Temporary or seasonal furloughs could account for these disruptions. For consistency, we take the start date of present employment as definitive. We cross-checked the start date of present employment against the duration of employment with the firm, which is captured through a separate question, and we retain only those individuals whose answers are consistent in our sample.

[14] The East and West German samples differ along a few additional dimensions. The proportion of women in the East German sample is much higher, reflecting the substantially higher labor force participation rate amongst East German women at the time of reunification (Krueger and Pischke, 1995). Education levels are also higher in the East German sample, both for vocational degrees as well as college degrees. To some extent, this reflects higher baseline educational attainment amongst East German workers at the time of reunification (Krueger and Pischke, 1995; Ammermüeller and Weber, 2005). Our requirement to consider only full-time employed workers in the analysis may also have contributed to the differences in gender and education between the East and West German samples.

[15] These variables are chosen because poor health and working hours are correlated with individual's stress management capabilities which are unobservable and

Table 2
Determinants of job satisfaction: baseline random effects, fixed effects and Hausman-Taylor models.

	RE (1)		FE (2)		Hausman-Taylor (3)		Hausman-Taylor (4)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Pre-reunification Job (μ_1)	0.140*	(0.074)			0.730***	(0.143)	0.715***	(0.144)
East German (μ_2)	−2.833***	(1.012)			−2.792**	(1.357)	−2.452*	(1.378)
EG Pre-reuni. Job (μ_3)	0.0201	(0.141)			0.768***	(0.274)	0.704**	(0.275)
Stays in East Germany	−0.404	(0.366)	−2.667***	(0.991)	−0.913*	(0.482)	−1.002**	(0.497)
Public Sector Employee	0.194***	(0.068)			0.182*	(0.098)	0.174	(0.106)
Career Civil Servant	−0.0688	(0.099)	0.0404	(0.280)	0.133	(0.138)	0.112	(0.147)
Autonomy	0.0821***	(0.025)	0.0942**	(0.037)	0.0929***	(0.028)	0.0939***	(0.029)
Duration with Firm	−0.0071*	(0.004)	−0.167	(0.119)	−0.0735***	(0.014)	−0.0718***	(0.014)
Work Hours per Week	−0.0023	(0.003)	0.0043	(0.004)	0.0042	(0.003)	0.0043	(0.003)
Log Personal Income	0.380***	(0.076)	0.461***	(0.113)	0.474***	(0.098)	0.472***	(0.098)
Firm Size: 20 to 199	−0.249***	(0.071)	−0.210*	(0.118)	−0.241***	(0.082)	−0.245***	(0.084)
Firm Size: 200 to 1999	−0.275***	(0.075)	−0.147	(0.135)	−0.220**	(0.090)	−0.231**	(0.093)
Firm Size: 2000+	−0.310***	(0.076)	−0.193	(0.144)	−0.242***	(0.093)	−0.255***	(0.096)
Poor Health	−0.551***	(0.021)	−0.357***	(0.026)	−0.358***	(0.024)	−0.359***	(0.023)
Disability	−0.250***	(0.077)	−0.287***	(0.108)	−0.308***	(0.084)	−0.304***	(0.085)
Vocational Degree	0.110*	(0.065)	0.0508	(0.096)	0.108	(0.073)	0.111	(0.074)
College Degree	−0.0969	(0.097)	0.178	(0.198)	−0.105	(0.123)	−0.103	(0.128)
Married	0.0987	(0.067)	−0.0638	(0.124)	0.0026	(0.083)	0.0064	(0.084)
Disrupted Marriage	0.113	(0.091)	0.261	(0.168)	0.109	(0.113)	0.124	(0.114)
Male	−0.066	(0.065)			0.0155	(0.094)	0.0018	(0.104)
Age	−0.0816***	(0.019)	0.0484	(0.124)	−0.0674**	(0.026)	−0.0702***	(0.027)
Age Squared	0.0010***	(0.000)	0.0008*	(0.000)	0.0011***	(0.000)	0.0011***	(0.000)
Constant	7.243***	(0.577)	2.307	(3.154)	5.471***	(0.910)	5.545***	(0.912)
Occupation Dummies	No		No		No		Yes	
East German Interactions	Yes		Yes		Yes		Yes	
Observations	18,528		18,528		18,528		18,517	
Number of Persons	5384		5384		5384		5376	
Hausman Chi-square Statistic	348.87				37.14		58.44	
Hausman Test p-value	0				0.116		0.967	

Notes: Standard errors reported in parentheses: *p<10%, **p<5%, ***p<1%

more efficient and consistent than the random effects estimates, we will base our analysis on the Hausman-Taylor regressions.

Column (3) presents our baseline Hausman-Taylor estimates, without occupational dummies. In all our specifications, we interact the East German dummy variable with the controls $EG_i \cdot X_{it}$ but for brevity we report only the coefficients βX_{it} which are the effects for West Germans. In general, the interaction term coefficients $\delta EG_i \cdot X_{it}$ are statistically insignificant, indicating effects of the controls on job satisfaction do not differ between East and West Germans, with the exception of log of personal income, where the effect is significantly larger for East Germans. The results of the time varying variables show that higher autonomy at work and higher personal income increases job satisfaction. On the other hand, poor health, having a disability, working in larger firms and having longer work experience with the same firm reduces job satisfaction. Job satisfaction is also found to be U-shaped with respect to age. Considering the time invariant variables, public sector employees were more satisfied with their jobs than private sector employees at the 10% significance level. Overall, these results are largely in accordance with the literature (Clark et al., 1996; Frijters et al., 2004).

Does risk based job choice matter? We find that μ_3 is positive and quantitatively significant, which implies that the relative long-run job satisfaction derived from choosing a job in the absence of risk matching is significantly *higher* than that of choosing a job when risk matching is possible. Therefore, there is no evidence that being able to match risks when choosing jobs increases long-run job satisfaction, and crucially, it appears that such a presumptively optimizing choice could actually reduce welfare.

We recognize this is an unexpected finding, and while we perform more substantial robustness tests in the next section, here we describe some features of our baseline models in Table 2 that address basic concerns to validity. The first concern is that our key estimate μ_3 is based on an East German dummy variable that potentially confounds pre-reunification origin and location of current residence. We have addressed this concern by including in our baseline models a dummy variable for current residence in East Germany, and an additional interaction term of the current residence dummy variable with East German pre-reunification origin, as part of the (unreported) interaction terms $\delta EG_i \cdot X_{it}$. Our results are thus unlikely to be caused by the generalized difference in living conditions between the territories of the former GDR and FRG, nor by selective internal migration of former East or West Germans.

The second concern is that conditions of work for similar jobs may differ between East and West Germany for reasons such as differing management principles, methods, technology, and so forth. These differences might explain why the relative job satisfaction differential μ_3 is positive. We address this in column (4) by including a full set of occupation dummies, generated from 2-digit ISCO occupation codes, and the interaction of these occupational dummies with the East German origin dummy to allow job satisfaction to differ systematically between East and West Germany by occupation. Despite the addition of these occupational dummy variables, our estimate of μ_3 remains positive and significant at the 5% significance level.

5. Overview of robustness tests

Here, we discuss whether we can reasonably interpret μ_3 as a measure of the effect of job choice in the absence of risk matching on job satisfaction. Despite the advantages of our setting, which enjoys commonality in culture, language, social structure and post-reunification political regime, the economic transition in

are likely to be correlated with job satisfaction. Duration with firm, on the other hand, is correlated with individual's sense of commitment and loyalty to the firm, which is unobservable as well. Other job characteristics such as income are not found to be endogenous according to the Hausman test.

East Germany after reunification was a complex process. Our main results hinge on the estimated job satisfaction of East Germans holding pre-reunification jobs, who are relatively more satisfied than expected, given that their jobs were chosen in the absence of risk matching. We are concerned that other determinants of job satisfaction might bias upwards our estimates of μ_3, generating a spurious positive association between job choice in the absence of risk matching and job satisfaction. It may be that East Germans holding pre-reunification jobs are 'more satisfied than they should be' for other reasons connected with the reunification process. Conversely, it is also possible that East Germans holding post-reunification jobs are 'less satisfied than they should be' . It is less likely that bias arises from the West German estimates since the economic turmoil following reunification was largely experienced by East Germans.

We consider four possible confounding factors: 1) Prior experience under the socialist regime may have given East German employees lower expectations for their work environment relative to West Germans; 2) East Germans remaining in their pre-reunification jobs could have been adversely selected and so would be relatively satisfied at retaining their sinecures; 3) East Germans remaining in pre-reunification jobs could have considered themselves relatively fortunate compared to East Germans forced to take up lower quality post-reunification jobs; and 4) East Germans forced by unemployment to switch into post-reunification jobs could have experienced persistent reductions in job satisfaction, generating a spurious relative increase in job satisfaction for East Germans holding pre-reunification jobs. We additionally document that as predicted earlier, the effect of holding pre-reunification jobs is stronger amongst older workers due to their higher job switching costs.

5.1. Job expectations

Because self-reported well-being is inherently subjective, heterogeneous expectations over work, income and career advancement could affect how different workers rate their satisfaction with a similar work environment. While individual heterogeneity in expectations is effectively classical measurement error, our results may be biased upwards if East Germans holding pre-reunification jobs have systematically lower job expectations than other groups do. Under state-planned centralized decision making, East Germans could have been accustomed to a low degree of autonomy and control in their pre-reunification jobs, with consequently low expectations for income, career progression and working conditions. If so, for East Germans holding pre-reunification jobs, market-driven post-reunification reforms could have improved working conditions substantially relative to their low expectations, biasing our estimates upwards.

We argue for two reasons that upwards bias from lower East German expectations for work is mitigated. First, our data starts in 1995, five years after German reunification and after most of the rapid convergence in incomes and working conditions occurred. If expectations are at least partially adaptive, East Germans should have become more accustomed to their new working conditions by then.

For our second argument, we formulate a testable implication of the low expectations hypothesis. East Germans with low expectations holding pre-reunification jobs, experiencing unexpectedly large improvements at work, should have strongly desired to stay in these pre-reunification jobs. This implies a lower rate of voluntary job departure from pre-reunification jobs for East Germans compared with West Germans during this time period. To compare the proportion of East and West Germans who remained in their pre-reunification jobs while controlling for attrition, retirement and involuntary part-time work, we restrict our comparison to full time employees below age 55 in 1990 who participated in the GSOEP every year from 1990 to 2001.

Fig. 1 shows the proportion of East and West German full time employees who stayed on in their jobs after reunification. The proportion of East German employees who retained pre-reunification jobs after reunification is substantially lower than their West German counterparts throughout this period. However, the lower stay-on rates amongst East Germans are the result of high departure rates from pre-reunification jobs in East Germany during the early transition period. The largest difference in the stay-on rates between East and West Germany occurs in 1992, where the East German departure rate from pre-reunification jobs (27%) was thrice the West German departure rate (8%). The literature suggests that the high departure rates from pre-reunification jobs in East Germany between 1991 and 1993 were predominantly involuntary. While the official East German unemployment rate in 1992 was 14.4%, lower than our GSOEP-based estimated departure rate in the same year, the estimated East German unemployment rate averaged 33% between 1989 and 1992 when hidden unemployment such as early retirement, involuntary part-time work and training schemes for the unemployed is included (Burda and Hunt, 2001) .[16] This rapid rise in unemployment in East Germany in the early transition years affected all educational groupings and all classes in similar ways (Pollak and Müller, 2002). The spike in unemployment resulted from the slump in domestic demand in East Germany and in foreign demand by communist countries after the reunification, as well as the collective bargaining-driven increase in East German wages to excessive levels that did not reflect actual productivity (Franz and Steiner, 2000; Gernandt and Pfeiffer, 2009). Therefore, it appears that East Germans in the early years after reunification experienced involuntary departure rather than voluntary departure out of pre-reunification jobs. Post 1993, the departure rates appear to stabilize between East and West Germans. These job departure patterns are not consistent with the implication of lower East German departure rates from pre-reunification jobs that follows from the low expectations hypothesis.

5.2. Adverse selection

Our estimates of East German pre-reunification job satisfaction ratings may be biased upwards if low productivity East German workers were adversely selected into remaining in pre-reunification jobs, where they received unobserved wage-to-productivity premiums. Pre-reunification East German workers faced a compressed wage structure where pay and job prospects were not commensurate with productivity. Workers had little incentive to improve their efficiency, and merely strove to fulfill the targets prescribed by the State (Siebert and Schmieding, 1990). In the post-reunification market economy, higher productivity East Germans may have had incentives to sort into better paid, high performance jobs, while lower productivity East Germans would have faced poor alternative job prospects, effectively being negatively selected into remaining in pre-reunification jobs. As wages rose due to economic convergence, low productivity East Germans remaining in pre-reunification jobs could have received rising unobserved wage-to-productivity premiums, which would positively affect their job satisfaction.

The adverse selection argument implies that relatively productive East Germans leaving pre-reunification jobs should have earned more than unproductive East Germans remaining in pre-reunification jobs. Fig. 2 shows the mean and the 95 percent confidence intervals of the net personal income of East German full

[16] Figures were obtained from Statistik der Bundesagentur für Arbeit, Arbeitslosigkeit im Zeitverlauf.

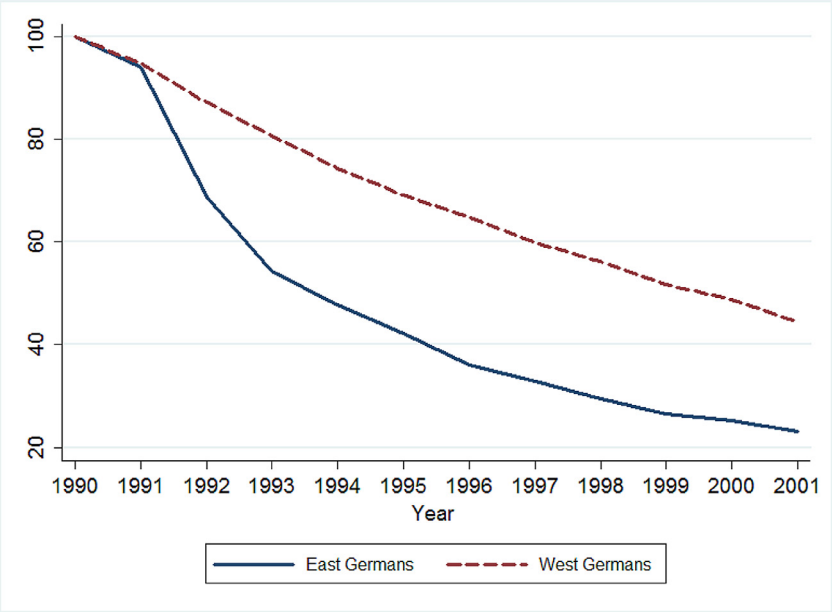

Fig. 1. Stay-on rate for full-time employees in East and West Germany.

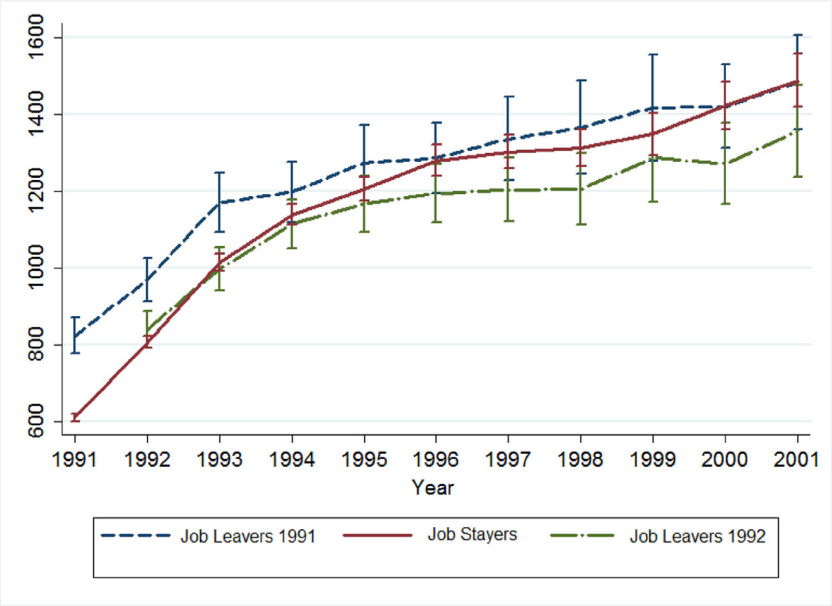

Fig. 2. Wage profiles of East German job stayers and job leavers from 1991 to 2001.

time employees who remained in pre-reunification jobs ("job stayers"), as well as that of the East German full time employees who switched jobs in 1991 and 1992 ("job leavers"). Fig. 2 suggests that while the 1991 cohort of job leavers initially had higher wages than the job stayers, this difference became smaller over time, and was insignificantly different after 1995. Wages of the 1992 cohort of job leavers on the other hand tended to remain lower than job stayers after 1995. As there is no consistent pattern in the difference between the wages of East German job stayers and job leavers, there is at best only weak evidence that those who remained in their pre-reunification jobs were adversely selected.[17]

We also make use of workers' self-reported opinions of their own job market competitiveness in our regression model to formally control for the possibility of adverse selection. We exploit a question in the GSOEP which asks survey respondents: "If you lost your job today, would it be easy, difficult, or almost impossible for you to find a new position which is at least as good as your current one?" Respondents could answer 'easy', 'difficult' or 'almost impossible' . Significantly, a larger proportion of respondents hold-

[17] Another reason for wage differentials and differences in relative job satisfaction between stayers and leavers could be structural changes in the East German economy which led to skill mismatches amongst leavers. Skills mismatch may mean that East Germans who found jobs post reunification could have lower wages and be less satisfied with their jobs compared to those who retained their jobs, biasing our estimates upwards. We have two reasons to believe skills mismatch was not the main driver of our results. First, our wage profiles for job leavers are constructed from those who found new work less than a year after they left their pre-reunification jobs, reducing the likelihood that the job leaver was desperate enough to accept a poorly matched job or had skills deteriorate after long-term unemployment. Second, the 1991 cohort of job leavers did not earn lower wages than those who remained in their pre-reunification jobs.

Table 3
Robustness tests for potential adverse selection into staying in pre-reunification jobs.

	(1)		(2)	
	Coefficient	SE	Coefficient	SE
Pre-reunification Job (μ_1)	0.793***	(0.164)	0.777***	(0.162)
East German (μ_2)	−2.171	(1.572)	−1.925	(1.563)
EG Pre-reuni. Job (μ_3)	0.844***	(0.313)	0.678**	(0.305)
Impossible to Find Job (μ_4)	−0.0916**	(0.040)	−0.148	(0.133)
Pre-reuni. * Impossible (μ_5)			0.0335	(0.143)
EG * Impossible (μ_6)			0.0426	(0.163)
EG * Pre-reuni. * Imposs. (μ_7)			0.0987	(0.196)
Stays in East Germany	−1.170**	(0.564)	−1.164**	(0.563)
Public Sector Employee	0.197	(0.122)	0.197	(0.122)
Career Civil Servant	0.145	(0.166)	0.146	(0.165)
Autonomy	0.0851***	(0.032)	0.0843***	(0.032)
Duration with Firm	−0.0823***	(0.015)	−0.0805***	(0.015)
Work Hours per Week	0.0063	(0.004)	0.0063	(0.004)
Log Personal Income	0.501***	(0.111)	0.501***	(0.111)
Firm Size: 20 to 199	−0.303***	(0.096)	−0.303***	(0.096)
Firm Size: 200 to 1999	−0.230**	(0.105)	−0.230**	(0.105)
Firm Size: 2000+	−0.202*	(0.109)	−0.202*	(0.109)
Poor Health	−0.386***	(0.027)	−0.387***	(0.027)
Disability	−0.244**	(0.097)	−0.243**	(0.097)
Vocational Degree	0.103	(0.079)	0.103	(0.079)
College Degree	−0.107	(0.138)	−0.106	(0.138)
Married	−0.101	(0.097)	−0.101	(0.096)
Disrupted Marriage	0.0010	(0.130)	0.0015	(0.130)
Male	0.0288	(0.116)	0.0273	(0.116)
Age	−0.0465	(0.030)	−0.048	(0.030)
Age Squared	0.0010***	(0.000)	0.0010***	(0.000)
Constant	4.908***	(1.028)	4.945***	(1.024)
East German Interactions	Yes		Yes	
Observations	13,539		13,539	
Number of Persons	5315		5315	
Hausman Chi-square Statistic	26.56		27.2	
Hausman Test p-value	0.646		0.613	

Note: Standard errors reported in parentheses: *p<10%, **p<5%, ***p<1%

ing pre-reunification jobs, regardless of East or West German origin, reported it was 'almost impossible' to find a comparable job, compared with respondents holding post-reunification jobs. For instance, in 1995, 31% of East Germans and 25% of West Germans who held pre-reunification jobs found it 'almost impossible' to find a comparable job but only 14% of East Germans and 6% of West Germans holding post-reunification jobs felt the same. Adverse selection into remaining in pre-reunification jobs appears to be a common issue that also affects West German incumbents.

To test if the positive difference in job satisfaction found in East Germans holding pre-reunification jobs can be accounted for by adverse selection, we control for workers' self-reported opinions of their job market competitiveness in the following robustness check:

$$\begin{aligned} Jobsat_{it} = {} & \alpha_t + \mu_1 Old_i + \mu_2 EG_i + \mu_3 EG_i \cdot Old_i + \mu_4 Imposs_{it} \\ & + \mu_5 Old_i \cdot Imposs_{it} + \mu_6 EG_i \cdot Imposs_{it} \\ & + \mu_7 EG_i \cdot Old_i \cdot Imposs_{it} + \beta X_{it} + \delta EG_i \cdot X_{it} + u_i + \varepsilon_{it} \end{aligned}$$

where $Imposs_{it}$ is a dummy variable which is equal to 1 if the survey respondent found it almost impossible to find a comparable job and 0 otherwise. The base group thus comprises employees who perceived that it was easy or difficult to find a comparable job. We further include interaction terms of $Imposs_{it}$ with Old_i, EG_i and $EG_i \cdot Old_i$ to control for any potential differences in the extent of adverse selection in East and West Germany, as well as in East Germany before and after reunification.

Table 3 shows the results of the Hausman-Taylor regression of job satisfaction. Model (1) adds only the $Imposs_{it}$ term to the baseline model while (2) adds the full set of interaction terms discussed in this section. While (1) shows that individuals who report 'almost impossible' have lower job satisfaction, the effect is very modest. Once the full set of interaction terms is added in (2), the effect of being unable to find a comparable job does not differ statistically between East and West Germans, or between pre- and post-reunification groups. None of the additional interaction terms are statistically significant. Further, after controlling for difficulty in finding a comparable job, the magnitude and significance of μ_3 remains similar to the baseline estimate from Table 2, and is also similar across (1) and (2) in Table 3. We conclude that adverse selection is unlikely to cause significant upwards bias in the relative job satisfaction of East Germans holding pre-reunification jobs.

5.3. Relative fortunes in the Post-reunification job market

The post-reunification job market in East Germany was characterized by involuntary unemployment and economic uncertainty. East Germans who held pre-reunification jobs may have considered themselves fortunate relative to East Germans unable to retain their pre-reunification jobs, or East Germans seeking employment for the first time. If so, our results may reflect the relatively privileged position of East Germans in pre-reunification jobs rather than job choice in the absence of risk matching. To examine this further, we consider two issues that might have reduced job quality for East Germans who switched to post-reunification jobs: qualification devaluation, and political discrimination.

While we assumed that the common features of the education system such as the German professional/vocational training system promotes comparability of individuals between East and West Germany, qualifications highly valued in the GDR could have been devalued post-reunification. Socialist ideals and needs may have driven professional training and educational content in some fields, and existing knowledge and skills may have become obsolete with

access to West German technology and methods. East Germans seeking new jobs post-reunification could have experienced downwards job mobility if they were forced to accept significantly worse positions than their counterparts retaining pre-reunification jobs. If so, the relatively higher job satisfaction of East Germans holding pre-reunification jobs could be attributed largely to their relative fortune compared to their embittered East German counterparts holding low quality post-reunification jobs.

However, the available literature does not support this argument. First, East German educational and vocational qualifications were officially recognized in the Unification treaty due to the shared German tradition of occupational levels and fields structuring the labor market. Therefore, there was no institutional reason for qualification devaluation. Further, empirical studies on East Germany's job mobility in the early days of the transition (1989 to 1993) found a high degree of job stability and lateral mobility for East Germans who remained in the labor market (Huinink and Solga, 1994; Mayer et al., 1999). In fact, East German technical college and university degree holders were less likely to be unemployed and some experienced upwards job mobility after reunification (Mayer et al., 1999). Thus, there is little support for the argument that large-scale qualification devaluation and consequently downwards job mobility actually took place.

The second factor which could have led to downwards job mobility in East Germany after reunification is political discrimination. Job mobility in the former GDR was enhanced by party membership which signaled overt loyalty to the state. The 'disfavored' on the other hand were often allocated jobs by the State against their wishes. After reunification, political transformation returned the freedom of job choice to the 'disfavored' and removed the 'privileged' from office. Indeed, right after reunification, two thirds of the leadership positions which had existed in the GDR economy in 1989 were eliminated, being replaced by either West German leaders or East Germans with higher educational qualifications (Derlien, 1993; Steger et al., 2003; Best, 2005). The East German leaders who had close connections with the socialist regime had to seek alternate employment, but political stigma restricted their career prospects; Mayer et al. (1999) found a high rate of downward mobility with a low rate of unemployment among former managers and affiliates of the socialist regime in 1993.

To summarize, political discrimination against former East German administrators and managers connected with the socialist regime could have created many disgruntled former *apparatchiks* now condemned to low status post-reunification jobs. In turn, the relatively higher job satisfaction of East Germans holding pre-reunification jobs might reflect the difference in job satisfaction between 'ordinary' East Germans and disgruntled former *apparatchiks*. As a robustness test, we exclude both East and West Germans who occupied administrative, managerial, and teaching professions prior to 1990. Specifically, we exclude individuals who were legislators, senior government officials, corporate managers, managers of small enterprises, teaching professionals, public administrative service professionals and legal professionals (according to the ISCO-88 2-digit job codes) before 1990 as a robustness test. Column (1) in Table 4 presents the results. The coefficient μ_3 of the interaction term $EG_i \cdot Old_i$ remains positive and significant even after excluding the workers who were likely to suffer from political discrimination in the post-reunification era.[18] Thus, we believe it unlikely that our results are attributable to disgruntled former East German *apparatchiks* who had low job satisfaction in post-reunification jobs.

5.4. Persistent effects of unemployment on job satisfaction

East Germans holding post-reunification jobs could be 'less satisfied than expected' if they were forced to job-switch into these positions after suffering spells of unemployment. Prior work using the GSOEP shows that past unemployment causes persistent 'scars' on present-day measures of subjective well-being (Clark, Georgellis and Sanfey, 2001). If so, our estimates could reflect the relative satisfaction of East Germans holding pre-reunification jobs compared with dissatisfied, unemployment-scarred workers who switched into post-reunification jobs. To consider this hypothesis, we compared the prior (un)employment history for the years 1990–1994 of both East and West Germans holding post-reunification jobs in our estimation sample.[19]

The employment and unemployment rates of these two groups of post-reunification job holders are plotted in Fig. 3.[20] Unemployment rates were relatively high for both groups - not just the East German group. The West German unemployment rate amongst this group started at 25% in 1990 and declined steadily to 10% by 1994. The unemployment rate within the East German group started at 7%, rose to 19% in 1992, and declined to 12.5% by 1994. The data is consistent with the economic turbulence of reunification causing a sharp increase in unemployment in East Germany in the early 1990s. However, unemployment rates amongst the West German post-reunification job holders are also significantly higher than the average rate in West Germany.

In part, this reflects the fact that our post-reunification group, for both East and West Germany, includes individuals who entered the labor market for the first time post-reunification, as well as individuals who switched jobs post-reunification. This makes the post-reunification job group (for both East and West Germany) younger on average than their pre-reunification counterparts. While the pre-reunification group, for both East and West Germany, had an average age of 43 in 1995, the post-reunification East German group's average age was 37 and the post-reunification West German group's average age was 32. Thus, the high unemployment rates even for West Germany reflect prior youth unemployment, as well as unemployment spells for individuals who have changed jobs. While we acknowledge that past unemployment spells will bias presently measured job satisfaction, the negative effects of past unemployment do not affect East Germans alone. The similar unemployment rates in both the West and East German post-reunification job groups give us some reassurance that our difference-in-differences estimation strategy should have controlled for this effect.

5.5. Labor mobility by age

The degree of labor mobility affects the extent to which workers remain in their (unsuitable) pre-reunification jobs. Therefore, the impact of holding a job chosen in the absence of risk matching should be greater for older workers who have less job mobil-

[18] We also controlled for industry effects on job satisfaction based on the 2-digit NACE industry classification in separate regressions. However, as there were inconsistencies within the panel data regarding which industry an individual belonged to for the same job, we do not report the results here. Nevertheless, our results show that industry effects do not affect the magnitude or significance of the key coefficient μ_3.

[19] East and West Germans holding pre-reunification jobs as of 1995, by definition, were employed throughout the period 1990-1994. As we discussed earlier in a footnote when we introduced the main data, a small number of pre-reunification job holders report occasional unemployment spells throughout 1990-1994. Cross-checks of the reported start date of employment and duration of employment with the firm give us confidence that these are likely to be temporary or seasonal furloughs.

[20] The employment and unemployment rates do not sum to 100% because vocational training, part-time employment, and marginal employment are reported as separate employment status categories in the GSOEP, and are distinct from full-time employment and unemployment. The number of individuals in these other categories is very small, compared with full-time employment and unemployment.

Table 4
Robustness tests excluding east german officials and by age group subsample.

	Excluding Former East German Officials (1)		Age 40 & above (2)		Age below 40 (3)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Pre-reunification Job (μ_1)	0.666***	(0.159)	0.506	(0.530)	0.664***	(0.163)
East German (μ_2)	−2.572*	(0.297)	0.291	(0.184)	0.122	(0.117)
EG Pre-reuni. Job (μ_3)	0.893***	(1.489)	2.011*	(1.057)	0.669**	(0.291)
Stays in East Germany	−0.229	(0.196)	−0.385	(1.085)	−0.939*	(0.538)
Public Sector Employee	0.177	(0.114)	0.291	(0.184)	0.122	(0.117)
Career Civil Servant	0.155	(0.174)	0.0372	(0.292)	0.0556	(0.159)
Autonomy	0.0893***	(0.032)	0.0469	(0.050)	0.103***	(0.034)
Duration with Firm	−0.0679***	(0.015)	−0.0278	(0.031)	−0.0792***	(0.019)
Work Hours per Week	0.0052	(0.004)	0.0142**	(0.006)	−0.0013	(0.004)
Log Personal Income	0.467***	(0.107)	0.289*	(0.163)	0.549***	(0.112)
Firm Size: 20 to 199	−0.253***	(0.089)	−0.168	(0.155)	−0.277***	(0.097)
Firm Size: 200 to 1999	−0.188*	(0.098)	−0.299*	(0.173)	−0.204*	(0.105)
Firm Size: 2000+	−0.265***	(0.103)	−0.221	(0.180)	−0.289***	(0.110)
Poor Health	−0.343***	(0.025)	−0.418***	(0.041)	−0.332***	(0.029)
Disability	−0.312***	(0.093)	−0.438***	(0.115)	−0.141	(0.126)
Vocational Degree	0.109	(0.078)	0.287**	(0.146)	0.0355	(0.085)
College Degree	−0.0677	(0.158)	0.142	(0.218)	−0.199	(0.151)
Married	0.0215	(0.091)	0.295	(0.310)	0.0026	(0.086)
Disrupted Marriage	0.0472	(0.125)	0.0773	(0.335)	0.273**	(0.125)
Male	−0.0379	(0.108)	−0.108	(0.205)	−0.0089	(0.107)
Age	−0.0587**	(0.029)	0.0739	(0.177)	−0.139***	(0.045)
Age Squared	0.0010***	(0.000)	−0.0006	(0.002)	0.0022***	(0.001)
Constant	5.324***	(0.994)	3.089	(5.172)	6.405***	(1.168)
East German Interactions	Yes		Yes		Yes	
Observations	16,047		5591		12,937	
Number of Persons	4728		1694		3690	
Hausman Chi-square Statistic	23.01		16.75		24.64	
Hausman Test p-value	0.733		0.953		0.648	

Note: Standard errors reported in parentheses: *p<10%, **p<5%, ***p<1%

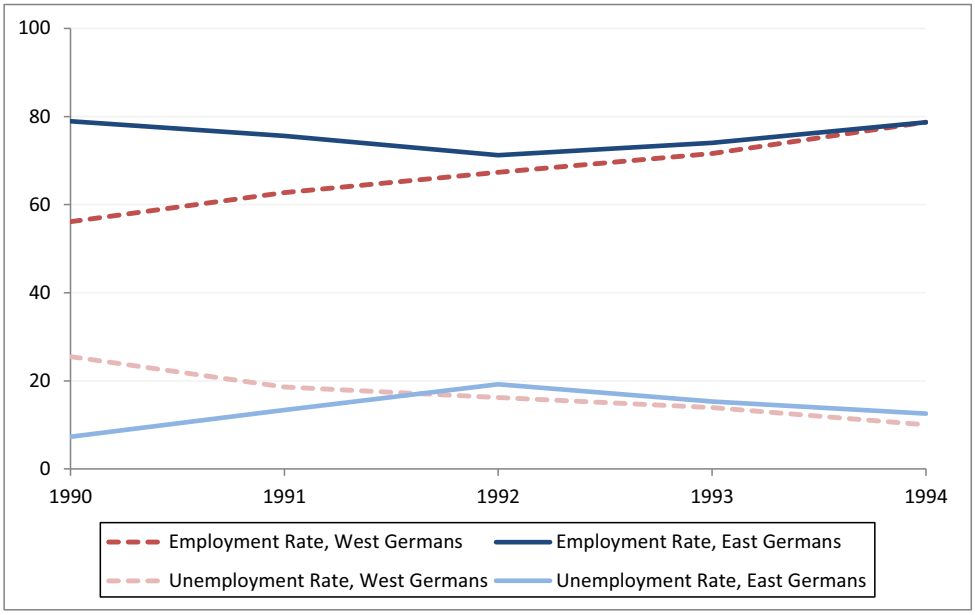

Fig. 3. Employment rate of post-reunification job holders from 1990–1994.

ity. In general, labor mobility in Germany is lower than in Anglo-Saxon countries, and labor mobility is well known to fall sharply with age (Mincer and Jovanovic, 1981; Dustmann and Pereira, 2008). We accordingly split the data at age 40, and estimate our Hausman-Taylor regressions separately on each portion of the data.[21] Columns (2) and (3) in Table 4 presents the results.

We find the effect μ_3 of holding a pre-reunification job with relatively poor risk matching is indeed larger in magnitude for the older age group. The estimated magnitude is more than three times as large for workers aged 40 and above, compared to that for workers aged 40 and below. Interestingly, the magnitude of the increase in the estimate for older workers is comparable to that of the decline in job mobility with age established in the literature. Overall, the evidence supports our interpretation of μ_3 as an estimate of the effect of making job choices without risk matching: less mobile workers, who should be the most poorly matched,

[21] The choice of age 40 is an arbitrary marker of 'middle age', but we have also experimented with other age breaks around 40 and find similar results. Note that we include workers aged 40 in both slices of the data.

exhibit stronger effects relating to job satisfaction than more mobile workers do.

6. Conclusion

Individuals face a complex set of tradeoffs when choosing careers. If individuals are utility maximizing and forward looking, they should have higher job satisfaction when job choice is based on risk preferences and income risks, relative to the case where job choice is made in the absence of risk matching. We test for the long-run existence of such improvements in job satisfaction by exploiting the natural experiment of the German reunification. Before reunification, West Germans chose jobs in a market economy where risk matching was important, while East Germans jobseekers faced little income risk variation across jobs in a non-market economy. Reunification exposed East Germans to the income risks of a market economy for the first time, allowing us to compare East Germans holding risk-unmatched pre-reunification jobs to West Germans holding risk-matched pre-reunification jobs.

We find that holding a pre-reunification job chosen in the absence of income risks bestows a statistically significant premium on job satisfaction, relative to holding a pre-reunification income risk-matched job. Our finding runs contrary to the basic prediction that utility maximizing forward looking individuals should experience higher job satisfaction when they are able to choose jobs with income risk matching in mind. Since our finding is based on the estimated relative effect on job satisfaction of being an East German holding a pre-reunification job, we test for whether alternate explanations particular to the post-reunification East German job market bias this estimate upwards. We find that East Germans' job expectations, adverse selection of lower quality workers into pre-reunification jobs, downwards occupational mobility amongst East Germans departing their pre-reunification jobs, and past unemployment spells affecting present job satisfaction are unlikely to explain our results.

Several implications for future research follow. Our results suggest that risk matching may not lead to higher job satisfaction for individuals in the long term, compared with choosing jobs based on optimizing over other tradeoffs. While this paper does not attempt to discriminate between mechanisms, we believe investigating the existence and effects of projection bias amongst job-seekers will be fruitful. A job choice problem is an inter-temporal choice problem. An individual is making a choice today that will keep that individual satisfied both in the present and in the future. A growing literature in behavioral economics documents that individuals facing such inter-temporal choice problems are subject to projection bias, where they tend to over-estimate the extent to which their future preferences resemble their current ones, hence making decisions that they later come to regard as suboptimal (Loewenstein et al., 2003). For example, individuals often overestimate the duration and the intensity of their reactions to positive and negative events, and misperceive the extent to which their current choices will suit their future preferences (Frederick and Loewenstein, 1999; Buehler and McFarland, 2001; Wilson et al., 2000; DellaVigna and Malmendier, 2006; Conlin et al., 2007).

In our context, projection bias implies that individuals may be systematically over-estimating the importance of risk preference matching for job satisfaction, or equivalently, under-rating the importance of other job preference parameters such as fit, aptitude, and interest, for their long run job satisfaction. We conjecture that individuals may overestimate the intensity or the duration of the adverse impact of working in a job which does not match their risk preferences when they are making job choices. These inaccurate expectations may in turn lead them to tradeoff or undervalue other important job characteristics which are more important to their job satisfaction than risk matching. It may indeed be the case that, as Confucius is said to have remarked, one who chooses a job well will never have to work a day in their life.

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Appendix.

Table A.1
Determinants of job satisfaction based on extended sample from 1995 – 2006.

	RE(1)		FE(2)		Hausman-Taylor(3)		Hausman-Taylor(4)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Pre-reunification Job (μ_1)	0.318***	(0.065)			0.890***	(0.111)	0.871***	(0.109)
East German (μ_2)	−2.654***	(0.832)			−1.423	(1.067)	−1.297	(1.072)
EG Pre-reuni. Job (μ_3)	0.201	(0.123)			0.671***	(0.213)	0.672***	(0.211)
Stays in East Germany	−0.183	(0.262)	−0.322	(0.388)	−0.296	(0.309)	−0.29	(0.308)
Public Sector Employee	0.203***	(0.062)			0.191**	(0.097)	0.167*	(0.099)
Career Civil Servant	−0.0844	(0.088)	0.0138	(0.218)	0.0752	(0.125)	0.063	(0.127)
Autonomy	0.108***	(0.020)	0.116***	(0.027)	0.111***	(0.022)	0.115***	(0.023)
Duration with Firm	−0.0188***	(0.004)	0.106	(0.082)	−0.0906***	(0.010)	−0.0881***	(0.010)
Work Hours per Week	−0.0027	(0.002)	0.0017	(0.003)	0.0020	(0.003)	0.0022	(0.003)
Log Personal Income	0.266***	(0.058)	0.421***	(0.076)	0.462***	(0.069)	0.450***	(0.069)
Firm Size: 20 to 199	−0.128**	(0.059)	−0.0084	(0.084)	−0.0768	(0.068)	−0.0794	(0.068)
Firm Size: 200 to 1999	−0.148**	(0.063)	0.0657	(0.095)	−0.0359	(0.074)	−0.0478	(0.075)
Firm Size: 2000+	−0.168***	(0.064)	0.0356	(0.100)	−0.0542	(0.077)	−0.0622	(0.077)
Poor Health	−0.532***	(0.017)	−0.387***	(0.019)	−0.391***	(0.018)	−0.391***	(0.018)
Disability	−0.258***	(0.060)	−0.266***	(0.074)	−0.277***	(0.064)	−0.279***	(0.064)
Vocational Degree	0.0888	(0.056)	0.0217	(0.077)	0.0824	(0.064)	0.0819	(0.064)
College Degree	−0.153*	(0.084)	0.0769	(0.153)	−0.171	(0.107)	−0.172	(0.108)
Married	0.104*	(0.057)	0.0198	(0.090)	−0.0037	(0.070)	0.0035	(0.070)
Disrupted Marriage	0.147*	(0.075)	0.278**	(0.117)	0.14	(0.091)	0.14	(0.091)
Male	−0.0019	(0.059)			0.0546	(0.092)	0.0588	(0.095)
Age	−0.0629***	(0.015)	−0.171**	(0.084)	0.0059	(0.019)	0.0012	(0.019)
Age Squared	0.0007***	(0.000)	0.0000	(0.000)	0.0003	(0.000)	0.0003*	(0.000)
Constant	7.572***	(0.452)	9.281***	(2.103)	4.088***	(0.650)	4.227***	(0.650)
Occupation Dummies	No		No		No		Yes	
East German Interactions	Yes		Yes		Yes		Yes	
Observations	29,541		29,541		29,541		29,524	
Number of Persons	5650		5650		5650		5645	
Hausman Chi-square Statistic	526.41				52.19		88.8	
Hausman Test p-value	0.000				0.004		0.285	

Notes: Standard errors reported in parentheses: *p<10%, **p<5%, ***p<1%

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